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Erosion in the Driftless Area

A. C. Trowbridge. **The Erosional History of the Driftless Area.** 127 pp.; maps, diagrs., ills. *Univ. of Iowa Studies in Nat. Hist.*, Vol. 9, 1921, No. 3 (1st Ser. No. 40). University of Iowa, 1921. 9½ x 6½ inches.

The Driftless Area of southwestern Wisconsin, extending into adjacent portions of Minnesota, Iowa, and Illinois, is a field of absorbing interest to the student of earth sculpture, for here is a region, well within the drift-covered district of the United States, in which the products of normal subaerial erosion have been preserved intact. Since the early and well-known description of the area by Chamberlin and Salisbury a considerable number of articles have been devoted to certain parts of it, but few have taken up the erosional history of the district as a whole. Professor Trowbridge has studied many parts of the area, has been at work in it at intervals during a number of years, and is thus well qualified to speak of it as a whole.

His report is divided into two approximately equal parts, the first of which is entitled "Multiple Erosional Cycles in Principle." Here he gives an analysis and discussion of the evidences to be looked for which will indicate that a given district has undergone more than one cycle of erosion. These evidences are interrupted profiles of valleys, stream terraces, intrenched meanders, associated sets of straight and crooked streams, antecedent streams, wind gaps, even-crested summit areas, intermediate plains, and fluviatile deposits on uplands. Each of these evidences is analyzed in some detail, and the conclusion is reached that no one of the lines of evidence can be relied upon as absolute proof of more than one cycle of erosion, but that some lines of evidence are more convincing than others. In any particular area the combination of two or more of these lines of evidence should be relied upon to prove more than one cycle of erosion; and the more combinations, the more clear the proof.

The application of the above analysis to the Driftless Area shows that in that area the following evidences point to more than one cycle of erosion: Even-crested summit areas, intermediate plains, antecedent streams, entrenched meanders, associated sets of crooked and straight streams, stream terraces, and upland fluvial deposits. A feature of the Driftless Area is the presence of even-crested summit districts which mark a peneplain here designated as the Dodgeville plain. Above this plain rise a few erosion remnants. The Dodgeville plain slopes S. 23° E. at a rate of 3.3 feet per mile and is thus not in accordance with the nearly flat strata of the district, which have an average dip of 14.2 feet per mile towards S. 28° W. This plain bevels across, though at a very low angle, strata from the Niagara down to Prairie du Chien (Lower Magnesian), and the author considers the flat tops of the Baraboo quartzite ridges to belong to this same erosional surface. Lying about 200 feet below this plain is another, the Lancaster plain. This is the most prominent feature of the district and has, in the author's opinion, been confused with the higher plain. Into the Lancaster plain, which slopes 7.6 feet per mile towards S. 11° E., have been cut the valleys of the region, and some of their larger streams have markedly intrenched meanders.

The erosional history of the Driftless Area includes the formation of the extensive Dodgeville plain which the author considers to have been completed in Tertiary time—in late, rather than early or middle Tertiary time. This was followed by a slight uplift and the development of the Lancaster plain, which is of late Tertiary or possibly early Pleistocene age, for there is some evidence that this plain had not been dissected at the time of the deposition of the Pre-Kansan drift. Then an uplift of about 600 feet occurred, followed by the development of the present topography of early maturity. About the time of the Wisconsin drift the district was depressed approximately 180 feet.

An interesting feature of the paper is the explanation of the history of the Mississippi River between Minneapolis and Dubuque and the suggestion of this river's antecedent character.

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